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SYSTOLIC STRESS VERSUS DIASTOLIC STRESS ECHOCARDIOGRAPHY FOR FUNCTIONAL IMAGING AND CORRELATION WITH FRACTIONAL FLOW RESERVE IN PATIENTS WITH STABLE ANGINA

ACC Poster Contributions
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Authors: *Motoyoshi Maenaka, Kansai Electric Power Hospital, Osaka, Japan, Koto Memorial Hospital, Higashioumi, Japan*

Background: A myocardial fractional flow reserve (FFR) below 0.75 has been shown to be functionally significant and associated with inducible ischemia. However the FFR between 0.75 and 0.80 has been established as a "gray zone" range. The aim of this study is to evaluate FFR by a comparison between systolic stress echocardiography (SSE) and diastolic stress echocardiography (DSE) for functional imaging.

Methods: We investigated 43 patients (mean age; 66 ± 7 years, Male/Female; 37/6) with stable angina who underwent both treadmill stress echocardiography and FFR measurement of an angiographically detectable significant stenosis. SSE and DSE were performed to determine myocardial ischemia that was compared with FFR. Exercise testing was performed according to the Bruce treadmill protocol. Strain image by using 2-dimensional speckle tracking echocardiography was obtained at baseline, immediately after, and 5 minutes after exercise. A positive SSE was defined as the development of a new regional left ventricular systolic wall motion abnormality. Stain values at the closure of aortic valve (A) and at the one third diastole duration (B) were measured. The strain image-diastolic index was determined as (A-B)/A×100%, and the ratio of strain image-diastolic index before and 5 minutes after exercise (SI-DI ratio) was used to identify regional left ventricular delayed relaxation. A positive DSE was defined as SI-DI ratio <0.74.

Results: The FFR at maximum hyperemia averaged 0.79 ± 0.10 and quantitative angiography averaged 49.7 ± 10.5 %. SSE based receiver-operator characteristics (ROC) analysis of FFR yield optimal cutoff values of 0.75. Sensitivity and specificity of FFR were 92 % and 93 %, respectively. The best cutoff value of the FFR by DSE based ROC analysis was 0.83, which yield a sensitivity and specificity of 97 % and 92 %, respectively.

Conclusions: FFR <0.83 could be optimal index for detection of the reversible myocardial ischemia by using diastolic stress echocardiography.